

Interactive comment on “A reconstruction of Iberia accounting for W-Tethys/N-Atlantic kinematics since the late Permian-Triassic” by Paul Angrand et al.

Anonymous Referee #1

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This is a short paper dealing with the long lasting problem of the Mesozoic kinematics of Iberia. Here the authors revise the the Permo-Triassic rifting stage in Iberia and surrounding regions, and propose that including this stage into the puzzle may help in reconciling geological evidence and plate kinematic models. In detail, the authors suggest that Iberia cannot be considered an integer plate but, rather, it must be separated into the Ebro and Western Iberia blocks, which is in agreement with most of the recently published works on this topic/area.

The work is well written and well illustrated.

There are some minor points that should be addressed and a major issue.

C1

Major point Hundreds of km of Mesozoic sinistral movements between Iberia and Europe have been postulated in several plate kinematic reconstructions since the 70's. The North Pyrenean Fault has been indicated as the Iberia-Europe Mesozoic plate boundary that should have accommodated such a huge amount of strike-slip/transpressive motion. As reported by the authors, there are currently no firm geological constraints supporting significant sinistral deformation during the Jurassic or the Cretaceous along this fault. The authors thus propose that the Mesozoic strike-slip movement could have partly occurred along the Ebro-W Iberia boundary. In detail, they propose that along this boundary, the Asturian, Maestrat, Cameros, and Columbretes basins formed/were reactivated as pull apart basins within a lithospheric Mesozoic sinistral strike-slip shear zone, where hundreds of km of sinistral motion would have occurred. The authors do not individuate and describe the lithospheric fault(s) bordering the pull apart system and ensuring the connection of the sinistral shear zone with the Bay of Biscay and the north Atlantic. As far I know, the only candidate is the 400 km long Ventaniella Fault. Thus, it is mandatory to describe and discuss the nature and kinematics of this fault. Apart from this, my impression is that using Ventaniella + North Pyrenean faults instead of the North Pyrenean fault along, is jumping out of the frying pan into the fire: The Ventaniella fault is well exposed and only gently affected by Cenozoic deformation. Paleozoic markers across it are presently offsetted in a dextral sense of less than 5 km (see Alvarez-Marrón, 1995. Journal of Structural Geology or any published geological map of the Cantabrian region). The dextral movement for the Ventaniella fault is generally attributed to a Cenozoic stage. One may argue that the amount of this Cenozoic displacement could be not well constrained (Mesozoic sinistral + cenozoic dextral). However, you can use the Cenozoic dextral displacement of the 100 km long Ubierna fault, which significantly overlaps the Ventaniella fault at its SE tip, to get an idea of the order of magnitude. For the Ubierna fault, the Cenozoic dextral displacement proposed by different authors ranges from 10 km (see Tavani et al., 2011, Tectonophysics) to almost nothing (see Quintana et al., 2015, Tectonophysics). Thus, if we remove 0 to 10 km of Cenozoic dextral displacement for the Ventaniella fault, we

C2

end up with Paleozoic markers displaced in a sinistral sense - during the Mesozoic - of less than 5 km. This issue should be addressed.

Minor points Line 2 well registered L3 a key L4 The Late Permian-Triassic Iberian rift basins have accommodated. . . L8 reconstruction, we L19-21 and orogens. However, the required. . .often uncertain. L 42 Understood by who? Also, here and below it must be clearly differentiated between papers in which the strike-slip motion is postulated/suggested, from those in which evidence of strike-slip tectonics is documented L 46 list the evidence L59 I suggest to briefly mention the permo-triassic stratigraphy of the area. L71. Remove pre-salt (no salt has been introduced to the reader) L76-81. Poorly relevant L82-83. Rephrase it L90-3. Cryptic L93-94. Expand the concept. L 94-104. This is material for the discussion. L96 breakup (L112-115. Add Alvaro et al '79. Alvaro, M., del Villar, R. C., & Vegas, R. (1979). Un modelo de evolución geotectónica para la Cadena Celtibérica L119. See Gomez et al 2002 for a partial subsidence curve in the Basque-Cantabrian basin. Additional curves can be probably derived from papers published in the book "The Geology of Spain". L139. As it stands, it seems that Rat and Aurell have suggested left-lateral tectonics, which is not the case. L174. Label them in figure 4

Figs 2&3. Increase the font size

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